

Are you Ready...
Algebra ICD

Name:

Key

Real Numbers, Roots and Exponents

1. The $\sqrt{27}$ is between what two whole numbers?

5 and 6

2. The $\sqrt{71}$ is closest to what whole number?

8

Simplify:

3. $\frac{3b^2}{9b^5}$ $\boxed{\frac{1}{3b^3}}$

4. $\frac{(2p)^{-2} \cdot pq}{(p^2q)^4 \cdot p^0}$
 $\frac{\cancel{p^2}^1}{4p^8 p^8 q^4} = \boxed{\frac{1}{4p^9 q^3}}$

5. $\frac{5m^2n}{m^4} \cdot \left(\frac{m^{-3}}{n}\right)^{-2}$
 $\frac{5m^2n}{m^4} \cdot \frac{m^6}{n^2} = \frac{5m^8n^3}{m^4} = \boxed{5m^4n^3}$

6. $\frac{(3w)^4}{z^{-2}} \cdot (w^{-2}z)^{-2}$
 $\frac{81w^4 \cancel{z^2}^1 w^4}{z^2} = \boxed{81w^8}$

7. $\frac{x^2 \cdot y^0 \cdot 3^2}{x^3 \cdot y^{-4}}$
 $\frac{9 \cancel{x^2}^1 y^4}{x^3} = \boxed{\frac{9y^4}{x}}$

8. $\frac{(3x)^{-3}}{3y^3} \cdot \frac{x^{-2}y^2}{x^{-4}}$
 $\frac{x^4 y^2}{81x^3 y^3 x^2} = \frac{x^4 y^2}{81x^5 y^3} = \boxed{\frac{1}{81xy}}$

9. $\frac{3.6 \times 10^{-4}}{7.2 \times 10^6}$
 $\frac{.5 \times 10^{-10}}{1} = \boxed{5 \times 10^{-11}}$

10. $(7.6 \times 10^2) \cdot (2.0 \times 10^4)$
 15.2×10^6
 $\boxed{1.52 \times 10^7}$

11. $\frac{9.9 \times 10^6}{1.1 \times 10^{-4}}$
 $\boxed{9 \times 10^{10}}$

Equations in One Variable

Solve

12. $12 = x - 2$

$\begin{array}{r} +2 \quad +2 \\ 12 = x - 2 \\ \hline 14 = x \end{array}$

13. $3p - (-4) = 13$

$\begin{array}{r} 3p + 4 = 13 \\ -4 \quad -4 \\ \hline 3p = 9 \\ \frac{3}{3} \quad \frac{9}{3} \\ \hline p = 3 \end{array}$

14. $16 = 5(1 - x)$

$\begin{array}{r} 16 = 5 - 5x \\ -5 \quad -5 \\ \hline 11 = -5x \\ \frac{11}{-5} \quad \frac{-5x}{-5} \\ \hline x = -\frac{11}{5} \end{array}$

Key

$$20p + 7 = 17$$

$$\begin{array}{r} -7 \quad -7 \\ \hline \end{array}$$

$$\frac{20p}{20} = \frac{10}{20} \quad p = \frac{1}{2}$$

15. $9p + 7(p+1) = 17 - 4p$

$$9p + 7p + 7 = 17 - 4p$$

$$16p + 7 = 17 - 4p$$

$$\begin{array}{r} +4p \quad +4p \\ \hline 20p + 7 = 17 \end{array}$$

$$-16x + 10 = 90$$

$$\begin{array}{r} -10 \quad -10 \\ \hline \end{array}$$

$$\frac{-16x}{-16} = \frac{80}{-16} \quad x = -5$$

16. $\left[\frac{1}{5}x - 3x + 2 = \frac{2}{5}x + 18 \right] 5$

$$x - 15x + 10 = 2x + 90$$

$$-14x + 10 = 2x + 90$$

$$\begin{array}{r} -2x \quad -2x \\ \hline -16x + 10 = 90 \end{array}$$

$$-8 = 7x + 54$$

$$\begin{array}{r} -54 \quad -54 \\ \hline \end{array}$$

$$\frac{-62}{-7} = \frac{7x}{-7} \quad x = -\frac{62}{7}$$

17. $\left[\frac{2}{3}(x-4) = 3(x+6) \right] 3$

$$2(x-4) = 9(x+6)$$

$$2x - 8 = 9x + 54$$

$$\begin{array}{r} -2x \quad -2x \\ \hline -8 = 7x + 54 \end{array}$$

18. Currently, you have \$60 and your sister has \$135. You decide to save \$5 of your allowance each week, whereas your sister decides to spend her whole allowance plus \$10 each week. How long will it be before you have as much money as your sister?

x = # weeks

$$60 + 5x = 135 - 10x$$

$$\begin{array}{r} +10x \quad +10x \\ \hline \end{array}$$

$$\begin{array}{r} 60 + 15x = 135 \\ -60 \quad -60 \\ \hline \end{array}$$

$$\frac{15x}{15} = \frac{75}{15}$$

$$x = 5$$

$$\boxed{5 \text{ weeks}}$$

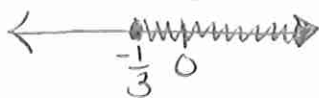
Solve and Graph the solution on a number line.

19. $3x + 5 \geq 4$

$$\begin{array}{r} -5 \quad -5 \\ \hline \end{array}$$

$$\frac{3x}{3} \geq \frac{-1}{3}$$

$$x \geq -\frac{1}{3}$$



20. $-x + 5 < 2(x-4)$

$$-x + 5 < 2x - 8$$

$$\begin{array}{r} +x \quad +x \\ \hline \end{array}$$

$$5 < 3x - 8$$

$$\begin{array}{r} +8 \quad +8 \\ \hline \end{array}$$

$$\frac{13}{3} < \frac{3x}{3} \quad x > \frac{13}{3}$$

21. $3 < 1 - 6x < 6$

$$\begin{array}{r} -1 \quad -1 \quad -1 \\ \hline \end{array}$$

$$\frac{2}{-6} < \frac{-6x}{-6} < \frac{5}{-6}$$

$$-\frac{1}{3} > x > -\frac{5}{6}$$



22. $2(x+3) < -4$ or $14x + (-3) > 4$

$$2x + 6 < -4 \quad \text{or} \quad 14x - 3 > 4$$

$$\begin{array}{r} -6 \quad -6 \\ \hline \end{array}$$

$$\frac{2x}{2} < \frac{-10}{2}$$

$$x < -5$$

$$\begin{array}{r} +3 \quad +3 \\ \hline \end{array}$$

$$\frac{14x}{14} > \frac{7}{14}$$

$$x > \frac{1}{2}$$



23. $-53 < 37 - 5x < 42$

$$\begin{array}{r} -37 \quad -37 \quad -37 \\ \hline \end{array}$$

$$\frac{-90}{-5} < \frac{-5x}{-5} < \frac{5}{-5}$$

$$18 > x > -1$$



Functions and Linear Relationships

Calculate the slope between the two points.

24. $(1, -6), (3, -2)$

25. $(3, 2), (-2, 2)$

26. $(8, 1), (8, -4)$

$$m = \frac{-2 - (-6)}{3 - 1} = \frac{-2 + 6}{2} = \frac{4}{2}$$

$$\boxed{m = 2}$$

$$m = \frac{2 - 2}{-2 - 3} = \frac{0}{-5}$$

$$\boxed{m = 0}$$

$$m = \frac{-4 - 1}{8 - 8} = \frac{-5}{0}$$

$$\boxed{m = \text{undefined}}$$

Key

Identify the slope and the y-intercept in each equation.

27. $y = -2x + 5$

$$\boxed{m = -2, (0, 5)}$$

28. $\frac{3y}{3} = \frac{2x}{3} + \frac{9}{3}$

$$y = \frac{2}{3}x + 3$$

$$\boxed{m = \frac{2}{3}, (0, 3)}$$

29. $4x - 6y = 14$

$$\begin{array}{r} -4x \quad -4x \\ -6y = -4x + 14 \\ -6 \quad -6 \quad -6 \end{array}$$

$$y = \frac{2}{3}x - \frac{7}{3}$$

$$\boxed{m = \frac{2}{3}, (0, -7/3)}$$

Write the equation of a line using the given information.

30. $(6, -1), m = 3$

$$y - (-1) = 3(x - 6)$$

$$y + 1 = 3x - 18$$

$$\boxed{y = 3x - 19}$$

31. $(5, -3), m = \frac{1}{5}$

$$y - (-3) = \frac{1}{5}(x - 5)$$

$$\begin{array}{r} y + 3 = \frac{1}{5}x - 1 \\ -3 \quad -3 \end{array}$$

$$\boxed{y = \frac{1}{5}x - 4}$$

32. $(-1, 3), (4, -2)$

$$m = \frac{-2 - 3}{4 - (-1)} = \frac{-5}{5} = -1$$

$$y - 3 = -1(x - (-1))$$

$$y - 3 = -1(x + 1)$$

$$\begin{array}{r} y - 3 = -1x - 1 \\ +3 \quad +3 \end{array}$$

$$\boxed{y = -1x + 2}$$

33. $(-2, -7), (6, -3)$

$$m = \frac{-3 - (-7)}{6 - (-2)} = \frac{-3 + 7}{6 + 2} = \frac{4}{8} = \frac{1}{2}$$

$$y - (-7) = \frac{1}{2}(x - (-2))$$

$$y + 7 = \frac{1}{2}(x + 2)$$

$$\begin{array}{r} y + 7 = \frac{1}{2}x + 1 \\ -7 \quad -7 \end{array}$$

$$\boxed{y = \frac{1}{2}x - 6}$$

34. vertical line thru $(2, -4)$

$$\boxed{x = 2}$$

35. horizontal line

thru $(8, -3)$

$$\boxed{y = -3}$$

36. parallel to $y = \frac{2}{3}x - 5$ thru $(-6, 2)$

$$m = 2/3 \quad y - 2 = \frac{2}{3}(x - (-6))$$

$$y - 2 = \frac{2}{3}(x + 6)$$

$$y - 2 = \frac{2}{3}x + 4$$

$$\begin{array}{r} +2 \quad +2 \end{array}$$

$$\boxed{y = \frac{2}{3}x + 6}$$

37. perpendicular to $y = -4x + 1$ thru $(-8, 3)$

$$m = \frac{1}{4} \quad y - 3 = \frac{1}{4}(x - (-8))$$

$$y - 3 = \frac{1}{4}(x + 8)$$

$$y - 3 = \frac{1}{4}x + 2$$

$$\begin{array}{r} +3 \quad +3 \end{array}$$

$$\boxed{y = \frac{1}{4}x + 5}$$

Transform the equation into standard form.

38. $y = \frac{3}{4}x - 2$

$$-\frac{3}{4}x - \frac{3}{4}x$$

$$-4 \cdot -\frac{3}{4}x + y = -2 \cdot -4$$

$$\boxed{3x - 4y = 8}$$

Key

Find the x and y intercepts of the given equation.

39. $3x - 2y = 12$

X: $3x - 2(0) = 12$ $y: 3(0) - 2y = 12$
 $\frac{3x}{3} = \frac{12}{3}$ $\frac{-2y}{-2} = \frac{12}{-2}$
 $x = 4$ $y = -6$
 $(4, 0)$ $(0, -6)$

40. $x - 3y = 15$

X: $x - 3(0) = 15$ $y: (0) - 3y = 15$
 $x = 15$ $\frac{-3y}{-3} = \frac{15}{-3}$
 $(15, 0)$ $y = -5$ $(0, -5)$

Graph the lines below using the given information on graph paper.

41.

x	y
-1	0
0	2
1	4
2	6

42. $2x - 5y = -10$

$(-5, 0)$
 $(0, 2)$

43. $y = -\frac{2}{3}x + 1$

Systems of Linear Equations

44. Is the point $(-2, 5)$ a solution of the system
 $2x + 5y = 26$
 $-x + 3y = 20$
 $2(-2) + 5(5) = 26$
 $-4 + 25 = 21$
 $21 \neq 26$
no

$2x - 3y = -3$

45. Solve using the graphing method: $\frac{1}{3}x + 2y = -3$

$2x - 3y = -3$ $\frac{1}{3}x + 2y = -3$
 $\frac{2x}{-2} - \frac{3y}{-2} = \frac{-3}{-2}$ $\frac{\frac{1}{3}x}{-\frac{1}{3}} + \frac{2y}{-\frac{1}{3}} = \frac{-3}{-\frac{1}{3}}$
 $-\frac{3y}{-3} = \frac{-2x-3}{-3}$ $-\frac{1}{3}x - \frac{2y}{-\frac{1}{3}} = \frac{9}{-\frac{1}{3}}$
 $\frac{2y}{2} = \frac{-\frac{1}{3}x-3}{2}$ $\frac{2y}{2} = \frac{-\frac{1}{3}x-3}{2}$
 $y = \frac{2}{3}x + 1$ $y = -\frac{1}{6}x - \frac{3}{2}$
 $3x - 4y = 6$

46. Solve using the substitution method:

$3x - 4(x-1) = 6$
 $3x - 4x + 4 = 6$
 $-x + 4 = 6$
 $-x = 2$ $x = -2$

$-x + y = -1$
 $+x \quad +x$
 $y = x - 1$

$y = -2 - 1$
 $y = -3$
 $(-2, -3)$

Key

47. Solve using the elimination/linear combination method: $\begin{cases} -4x - 5y = 7 \\ 3x + 10y = -24 \end{cases}$

$$\begin{array}{r} -8x - 10y = 14 \\ 3x + 10y = -24 \\ \hline -5x = -10 \\ \frac{-5x}{-5} = \frac{-10}{-5} \end{array}$$

$$x = 2$$

$$\begin{array}{r} -4(2) - 5y = 7 \\ -8 - 5y = 7 \\ -5y = 15 \\ \frac{-5y}{-5} = \frac{15}{-5} \end{array}$$

$$y = -3$$

$$(2, -3)$$

Solve using any method.

48. $\begin{cases} 3x + 5y = 7 \\ 6x + 10y = 8 \end{cases}$

$$\begin{array}{r} -6x - 10y = -14 \\ 6x + 10y = 8 \\ \hline 0 = -6 \\ \text{no solution} \end{array}$$

49. $\begin{cases} -2x - 3y = -8 \\ 6x + 2y = 24 \end{cases}$

$$\begin{array}{r} -6x - 9y = -24 \\ 6x + 2y = 24 \\ \hline -7y = 0 \end{array}$$

$$-7y = 0$$

$$y = 0$$

$$-2x - 3(0) = -8$$

$$\begin{array}{r} -2x = -8 \\ \frac{-2x}{-2} = \frac{-8}{-2} \end{array}$$

$$x = 4$$

$$(4, 0)$$

50. $\begin{cases} 5x - 2y = 4 \\ x - 0.4y = 0.8 \end{cases}$

$$\begin{array}{r} 5x - 2y = 4 \\ + 0.4y + 0.4y \\ \hline x = 0.4y + 0.8 \end{array}$$

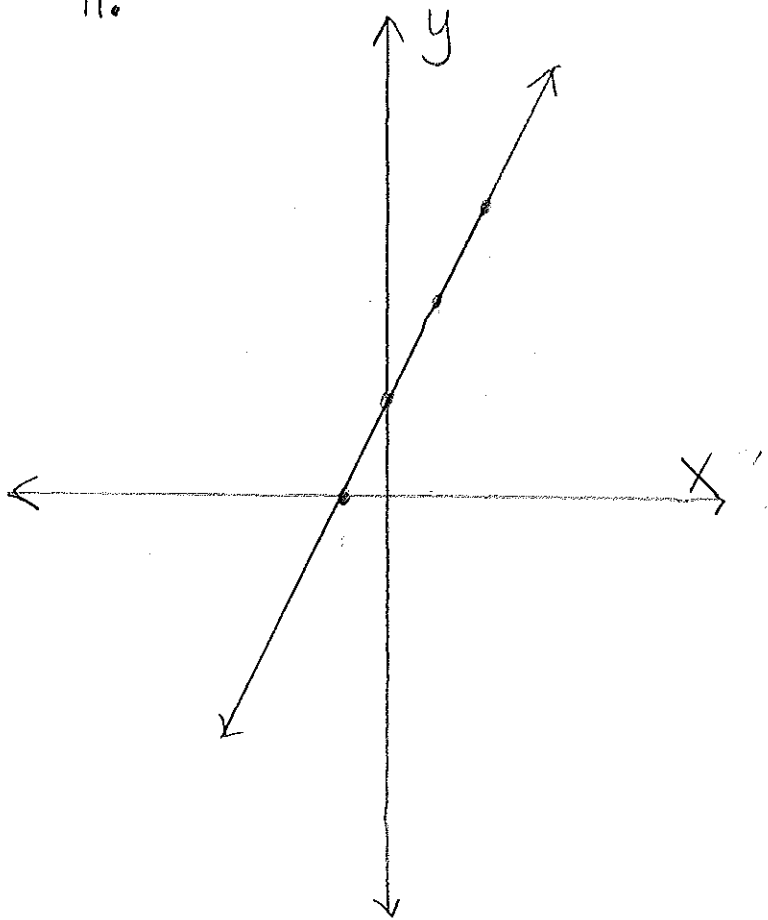
$$5(0.4y + 0.8) - 2y = 4$$

$$2y + 4 - 2y = 4$$

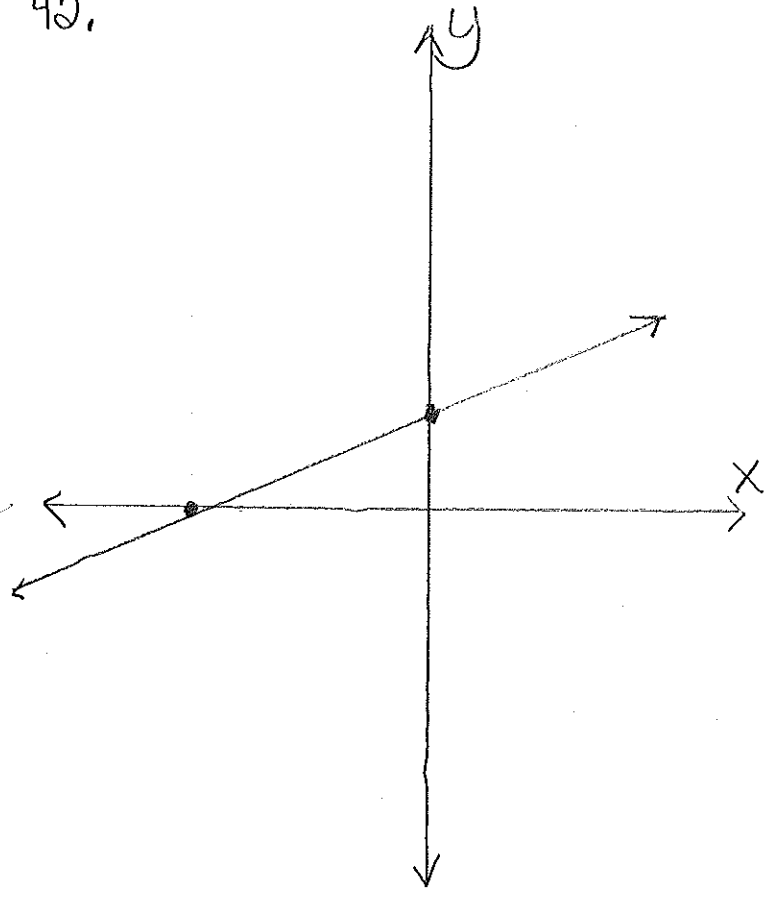
$$4 = 4$$

$$\text{infinite \# solutions}$$

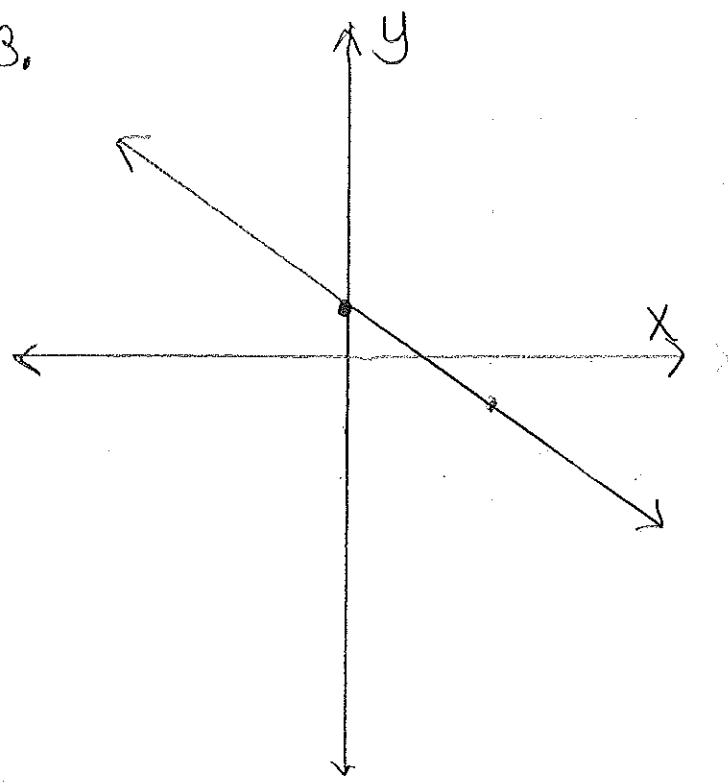
41.



42.



43.



44.

